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T2146-907703 - US 3884/BC(PCT)

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (D.O./E.O./US)

Applicant: Patrice HAMEAU et al.

International
Application No.: PCT/FR01/01506

International
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U.S. Serial No.: To be assigned

U.S. Filing Date: January 17, 2002

For: **METHOD FOR MAKING SECURE A TYPED DATA
LANGUAGE IN PARTICULAR IN AN INTEGRATED
SYSTEM, AND INTEGRATED SYSTEM THEREFOR**

McLean, Virginia

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

The following amendments and remarks are submitted prior to examination of
the above-identified application on the merits.

IN THE TITLE:

Please delete the title and substitute the following new title:

--METHOD FOR SECURING A TYPED DATA LANGUAGE, PARTICULARLY IN AN
EMBEDDED SYSTEM, AND EMBEDDED SYSTEM FOR IMPLEMENTING THE
METHOD--;

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IN THE SPECIFICATION:

Before the paragraph numbered [0001], insert the following heading:

--BACKGROUND OF THE INVENTION

1. **Field of the Invention.--**

Before the paragraph numbered [0007], insert the following heading:

--2. Description of the Related Art.--

Before the paragraph numbered [0027], insert the following heading:

--SUMMARY OF THE INVENTION--

Before the paragraph numbered [0038], insert the following heading:

--BRIEF DESCRIPTION OF THE DRAWINGS--

Before the paragraph numbered [0039], insert the following heading:

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--

Page 18, after paragraph [0124], insert the following new paragraph:

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--[0125] While this invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, the preferred embodiments of the invention as set forth herein, are intended to be illustrative, not limiting. Various changes may be made without departing from the true spirit and full scope of the invention as set forth herein and defined in the claims.—

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Page 19, after the heading "CLAIMS" and before the first claim, insert the following:

--We claim:--

IN THE CLAIMS

Please substitute amended claims 1-10 as presented below for the same-numbered claims that were pending prior to the filing of this paper. A marked-up version of the amended claims is attached.

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1 3. (Amended) A method according to claim 1, wherein said instructions
2 are written in Java language and said typed data are constituted by typed objects,
3 wherein said computer system includes a Java virtual machine in the
4 form of software for manipulating said typed objects,
5 wherein said storage locations in said memory of the computer system
6 are organized into stacks comprising a given maximum number of levels, each level
7 constituting one of said storage locations,
8 wherein said typed objects are stored in at least a first elementary
9 stack corresponding to a data area and a second elementary stack corresponding to
10 a local variable area, and
11 wherein said type information elements are distributed into two
12 additional elementary stacks that correspond one-to-one with said first and second
13 elementary stacks, in order to specify the type of said associated objects stored in
14 said data and local variable areas.

1 4. (Amended) A method according to claim 1, wherein, when there is no
2 match in said performing step, execution of said instruction sequence is interrupted
3 and replaced by execution of instructions corresponding pre-programmed security
4 measures.

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1 5. (Amended) A method according to claim 3, wherein said type
2 information elements are associated with additional information elements that
3 determine a size of said storage locations in said stacks storing said typed objects,
4 in order to make a size of said stacks variable, based on said objects to be
5 manipulated.

6. (Amended) A method according to claim 3, further comprising:
marking objects associated with said type information elements flags to
indicate whether said objects should be saved in said stacks or can be erased.

1 7. (Amended) A system for secure execution of an instruction sequence
2 of a computer application in the form of typed data stored in a first series of locations
3 in a memory of a computer system, comprising:
4 a computer data processor; and
5 a memory for storing type information elements, said memory
6 including:
7 a second series of locations for storing said type information
8 elements, associated with each of said typed data, in order to specify a type of said

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9 typed data, and
10 a program for continuously verifying, prior to execution of
11 predetermined instructions in said sequence, a match between a type indicated by
12 said instructions and a type indicated by said type information elements, so as to
13 authorize said execution only when there is a match between said types.

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1 8. (Amended) A system according to claim 7, wherein said first series of
2 locations in said memory is organized into stacks comprising a given maximum
3 number of levels, each of said levels constituting one of said storage locations,
4 wherein said typed data are stored in at least a first elementary stack
5 called a data area and a second elementary stack called a local variable area, and
6 wherein said second series of storage locations is organized into
7 elementary stacks that correspond one-to-one with said first and second elementary
8 stacks.

1 9. (Amended) A system according to claim 8, wherein said type
2 information elements stored in said second series of storage locations are
3 associated with additional information elements that determine a size of said storage
4 locations in said stacks storing said typed data.

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- 1 10. (Amended) A system according to claim 7, further including an
- 2 embedded smart card.

IN THE ABSTRACT

Please replace the Abstract as originally filed with the following new abstract:

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--ABSTRACT

A method is provided for the secure execution of an instruction sequence of a computer application written in typed objects or data, such as those used in Java language. The method may be executed in association with a memory of a computer system including a microchip. The memory is organized into a first series of elementary stacks which store instructions. The typed objects or data are associated with one or more bits, each of which indicates the type of the object or data with which it is associated. The bits are stored in a second series of elementary stacks that are in one-to-one correspondence with the stacks in the first series. Before executing predetermined types of instructions, a continuous verification is performed to determine whether a match exists between the types of the predetermined types of instructions and expected types indicated by the typing bits. If no match exists, the execution is stopped.--

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REMARKS

Claims 1-10 are pending. These claims have been amended to place them in a form which comports with established U.S. claim practice. Also, the specification has been amended to include section headers, and a new abstract has been provided.

It is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is respectfully requested.

Should the Examiner believe that further amendments are necessary to place the application in condition for allowance, or if the Examiner believes that a personal interview would be advantageous in order to more expeditiously resolve any remaining issues, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

To the extent necessary, Applicants petition for an extension of time under 37 CFR § 1.136. Please charge any shortage in fees due in connection with this application, including extension of time fees, to Deposit Account No. 50-1165

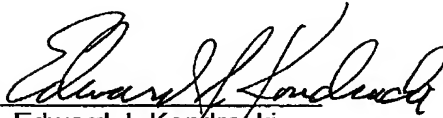
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(Attorney Docket No. T2146-907703) and credit any excess fees to the same
Deposit Account.

Respectfully submitted,

Date: January 17, 2002

By:



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Marked-Up Version of the Amended Claims

1 1. (Amended) A method [Method] for [the] secure execution of an
2 instruction sequence of a computer application, said application being in the form of
3 typed data stored in a first series of [given] locations in a memory of a computer
4 system including a microchip, [particularly an embedded microchip system,
5 characterized in that additional data called] wherein type information elements are
6 associated with each of said typed data[,] in order to specify a [the] specific type of
7 [these] said typed data, [in that] and wherein said type information elements are
8 stored in a second series of [given] storage locations [(4,5)] in said memory [(1) of a
9 computer system (8)], [and in that] comprising:

10 before [the] execution of instructions of said sequence [a
11 predetermined type], performing a continuous verification operation [is performed,
12 prior to the execution of predetermined instructions, of the matching] to determine
13 whether a match exists between one of a type of [indicated by these] instructions
14 and an expected type indicated by said type information elements stored in said
15 second series of storage locations [(4,5), so that]; and

16 authorizing [said] execution of said instructions of said sequence [is
17 authorized] only when there is a match between said [types] type of predetermined
18 instructions and the expected type.

1 2. (Amended) A method [Method] according to claim 1, [characterized in
2 that] wherein each of said type information elements includes [is constituted by] a
3 string of bits stored in storage locations of said second series [(4,5)] that correspond
4 one-to-one with storage locations in said first series [(2,3)] in which said associated
5 typed data are stored, and wherein a [the] configuration whereof represents on of
6 said types of typed data.

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information elements that determine a [the] size of said storage locations in said stacks [(2,3)] storing said typed objects, in order to make a [the] size of said stacks variable, based on said objects to be manipulated.

6. (Amended) A method [Method] according to claim 3, [characterized in that] further comprising:

marking objects associated with said type information elements [are associated with additional information elements called] flags[, in order to mark said objects that are associated with them and] to indicate whether said objects [they] should be saved in said stacks [(2,3)] or can be erased.

7. (Amended) [Embedded smart card] A system [comprising computer data processing means and storage means] for [the] secure execution of an instruction sequence of a computer application in the form of typed data stored in a first series of [given] locations in a memory of a computer system, [characterized in that] comprising:

a computer data processor; and

a memory, said [storage means] [(1) comprise] memory for storing type information elements, said memory including:

a second series of [given] locations [(4,5)] for storing [additional data called] said type information elements, associated with each of said typed data, in order to specify a [the] type of said typed [these] data, and

[verification means (6)] A program for continuously verifying, prior to [the] execution of predetermined instructions in said sequence, [the matching] a match between a type indicated by said [these] instructions and a type indicated by said type information elements, so as to authorize said execution only when there is a match between said types.

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1 8. (Amended) A system [System] according to claim 7, [characterized in
2 that] wherein said first series of [given] locations in said memory [(1) of the
3 embedded microchip system (8) being] is organized into stacks comprising a given
4 maximum number of levels, each of said levels [level] constituting one of said
5 storage locations,

6 wherein said typed data are stored in at least a first elementary stack
7 called a data area [(2)] and a second elementary stack called a local variable area
8 [(3)], and

9 wherein [in that] said second series of storage locations is [also]
10 organized into elementary stacks [(4,5)] that correspond one-to-one with said first
11 [(2)] and second [(3)] elementary stacks.

12 9. (Amended) A system [System] according to claim 8, [characterized in
13 that] wherein said type information elements stored in said second series of storage
14 locations [(4,5)] are associated with additional information elements that determine a
15 [the] size of said storage locations in said stacks [(2,3)] storing said typed data.

16 10. (Amended) A system [System] according to claim 7, [characterized in
17 that in said embedded system is a] further including an embedded smart card [(8)].